

REMARKS

Claims 1-18 are pending in the application. Claim 1 has been amended by the present amendment. The amendment is fully supported by the specification as originally filed.

Applicants' claimed invention is directed to a semiconductor package with a heat sink. As amended, claim 1 recites that the at least one slot includes a through hole penetrating top and bottom surfaces of the bonding portion of the heat sink.

As shown in FIG. 1, the heat sink 50 having top and bottom surfaces is disposed on a substrate 10 mounted with a chip 40. The heat sink 50 includes a flat portion 51 attached to the chip 40, a support portion 52 extending from an edge of the flat portion 51 toward the substrate, and a bonding portion 53 extending laterally from an end of the support portion 52, where the bonding portion 53 is connected to the substrate 10 by adhesive material 70.

At least one slot 54 is formed through at least one corner of the bonding portion 53, and includes a through hole penetrating the top and bottom surfaces of the bonding portion 53 of the heat sink 50 (see, e.g., FIG. 2). The adhesive material 70 is filled in the slot 54 and overflows out of the slot 54 (see page 9, lines 3-4).

According to the Applicants' invention, it is easy to control the amount of adhesive material 70 being used, since overflow of the adhesive material 70 indicates a sufficient amount is applied in the slot 54 (see page 9, first paragraph). Moreover, the cured adhesive material 70 filled in and overflowing out of the slot 54 provides an anchoring effect to firmly secure the heat sink in position on the substrate (see page 9, last paragraph).

Claims 1-3, 5-12, 17, and 18 were rejected under 35 USC 102(b) as being anticipated by U.S. Patent 5,956,576 to Toy et al. (hereinafter "Toy"). Claims 4 and 13-16 were rejected under 35 USC 103(a) as being unpatentable over Toy. These rejections are respectfully traversed.

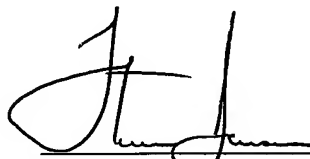
Toy does not teach or suggest a semiconductor package including a heat sink mounted on the top surface of a substrate, the heat sink having a support portion and a laterally extending bonding portion connected to the substrate, at least one slot comprising a through hole penetrating top and bottom portions of the bonding portion, and where adhesive material can overflow out of the slot.

In Toy, a dual surface sealant 23 is used to attach a corner area 29 of a cap 20 to a corner area 19 of a substrate 10 (see column 4, lines 19-21). However, Toy does not teach or suggest any “laterally extending bonding portion” of the cap 20 for connecting to the substrate 10. Instead, the sealant 23 is merely applied between the corner areas 29, 19 of the cap 20 and the substrate 10, respectively. Also, Toy does not teach or suggest the claimed “through hole penetrating the top and bottom surfaces of the bonding portion of the heat sink.” Therefore, it is not possible for the sealant 23 to be filled in or overflow out of any slot in Toy.

In the Office Action of 04/05/2005, it was stated: “A slot further is defined broadly ... and has not been recited in the claims as a through hole” (see Office Action, page 4, par. 6). As amended, claim 1 specifically recites that the slot comprises “a through hole penetrating the top and bottom surfaces of the bonding portion of the heat sink,” thus distinguishing over the Toy reference for at least the reasons discussed above.

It is believed the application is in condition for immediate allowance, which action is earnestly solicited.

Respectfully submitted,



Peter F. Corless (Reg. No. 33,860)
Steven M. Jensen (Reg. No. 42,693)
EDWARDS & ANGELL, LLP
P.O. Box 55874
Boston, MA 02205

Date: June 5, 2005

Phone: (617) 439-4444

Customer No. 21874